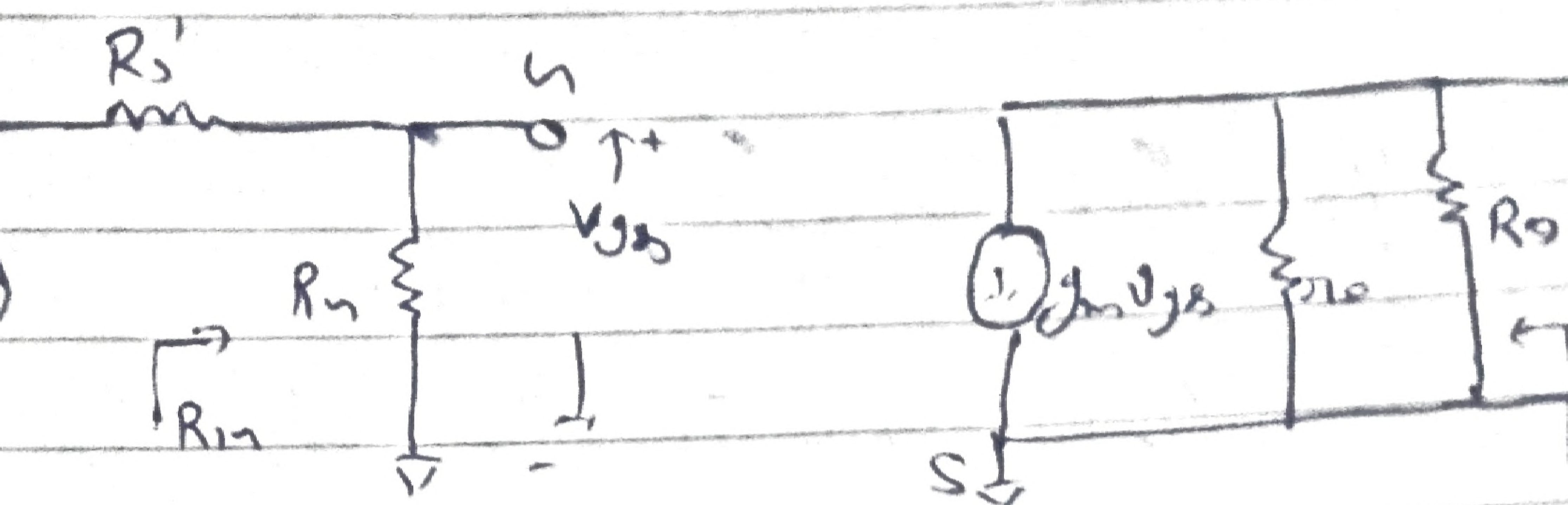


ent ckt for low freq. operation



Since there is Insulator b/w gate &
NO connection b/w them. So
input & Output (Ideal device)

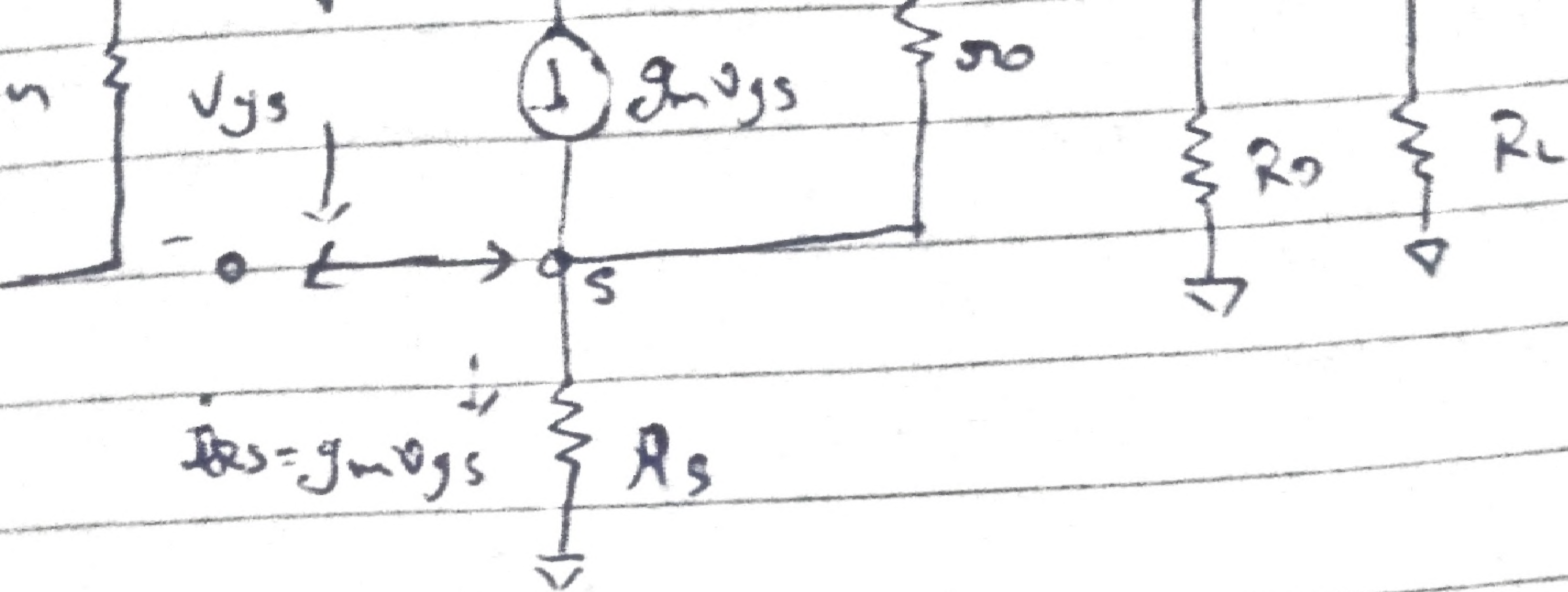
$$v_{gs} = \frac{R_{in}}{R_{in} + R_S'} v_{in} \approx v_{in} \quad \text{if } R_{in} \gg R_S'$$

$$v_o = -g_m (r_o || R_D || R_L) v_{in}$$

So output \$\rightarrow\$ 180° phase shift

$$A_v = \frac{v_o}{v_{in}} = -g_m (r_o || R_D || R_L)$$

$$\therefore r_o = \frac{1}{\lambda I_{DQ}} \quad ; \quad \text{Since}$$



grounded but not V_{gs} so I is

we $R_n \gg R_s'$

if $r_o \rightarrow \infty$ (very high)

$$V_{in} = V_{gs} + g_m V_{gs} \cdot R_s = V_{gs} (1 + g_m R_s)$$

$$V_{gs} = \left(\frac{V_{in}}{1 + g_m R_s} \right)$$

so

$$V_o = -g_m V_{gs} (R_o || R_L)$$

$$= -g_m (R_o || R_L) \frac{V_{in}}{1 + g_m R_s}$$

$$A_v = \frac{V_o}{V_{in}} = \frac{-g_m}{1 + g_m R_s} (R_o || R_L)$$